



### Short communication

# Kundudo feral horse: Trends, status and threats and implication for conservation

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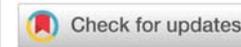
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## Abstract

Kundudo feral horses are the only feral horse in Ethiopia and are located Kundudo Mountain in the eastern part of Ethiopia. The purpose of this short communication report was to compile data from different sources including secondary data, reports from the woreda focal office, and interviews with woreda experts and guards directly working on Kundudo feral horses. Data such as trends, status, and threats to Kundudo feral Horses were compiled from mentioned sources. Currently, the Kundudo feral horses were conserved in situ at the top of Kundudo Mountain. currently, in 2021 and 2022 there are a total of 30 feral horses on the top of the mountain protected by guards and the number of this horse breed will be expected to rise if protected well. The main threat Kundudo feral horses face is a logistic problem, inbreeding, low conservation activities, and animal encroachment for feeding. The major activities performed for better conservation of Kundudo feral horses are awareness-raising campaigns, Kundudo Mountain was recognized as an in-situ site by the community, and the horses moved to their original place on the mountain, personnel was hired and a management plan was developed for stakeholders. Furthermore, having many negotiations among stakeholders, prominent stakeholders have reached a consensus and signed MoU on further engagement and tried to develop a new way of communication and management arrangement. Generally, the conservation of biological diversity is important particularly the conservation of threatened animal genetic resources like the unique horse species of Kundudo Mountain because there is no duplicate copy of species that has been conserved.

## Abbreviation

AnGR: Animal Genetic Resource; FAO: Food and Agricultural Organization; MoU: Memorandum of Understanding; UNESCO: United Nation Economic Social Cultural Organization; EBI: Ethiopian Biodiversity Institute; OEFCCA: Oromia Environment, Forest and Climate Change Authority; NGO: Non-Governmental Organization; CSA: Central Statistical Agency

## Introduction

AnGR are here defined as those animal species that are used or may be used, for food production and agriculture<sup>1</sup>, and the populations within each [1]. Animal genetic diversity provides the raw material for breed improvement and for the adaptation of the animal to changing environments and changing demands [2]. Cited in [3], composed of the breeds and strains of domesticated animals that humankind has

developed out of some 40 wild species over the last 10,000 years. Among these animal genetic resources, Horses have made a remarkable contribution to international human civilization. After domestication, horses were used for hunting, traveling, wars, landscape management, leisure, and serving as a nutrition source (milk and meat). The horse industry was an important investment in the 19th century, mainly for the strong economic countries.

Ethiopia comprises the largest horse population in Africa. According to [4], an agricultural survey report, the horse population in Ethiopia is estimated at 2.15 million, which contributes about a quarter of the whole African population. In Ethiopia, there are 8 distinct horse breeds and one Feral Horse (Kundudo) [5,6] On the other hand, the Namibian feral horses are the only horses that were historically known to exist in a feral state in Africa, south of the Sahara. However, an exploration by [5] officially reported the existence of the

Kundudo Feral Horses in eastern Ethiopia, Kundudo Mountain. The horses are said to acquire their name from the name of the mountain where they live as a feral animals.

Kundudo Feral Horses were located on Kundudo Mountain in the eastern part of Ethiopia by a team of experts and researchers from different institutions. Their historical backgrounds are not known because of the absence of any written attribution on this horse population. However, the same research team reported suggestions from local elders as the animals had been roaming on Kundudo Mountain plateau for an unknown period with few anecdotic theories. They believed the Kundudo Feral Horses are the remnants of the historically known Ethiopian Muslim–Christian war that took place from 1528 to 1560 between Ahmed Gragh (leader of the Muslim army) and Atse Lebna Dengel (leader of the Christian army). Kundudo Mountain is situated in a strategic place and local elders speculated that one of the army leaders had been using this mountain as a military strategy to control the progress of their enemy into the area.

Kundudo feral horses are identified as a critically endangered species population, of unknown origin, from the area of the Kundudo plateau near the city of Harar, in the East Hararge Zone of Oromia Regional. Some of the horses had successfully been captured by local inhabitants and were under the process of domestication. Moreover, horses are rarely seen in the area and, therefore, poor knowledge of horse management practices, high rate of inbreeding, and extreme market demands for newborn foals were major threatening factors to Kundudo

Horse breed. Currently, Haramaya University Signs MoU with Ethiopian Biodiversity Institute & Oromia Environment, Forest and Climate Change Authority. The overall objectives of the MOU include conserving and protecting the biodiversity of the Region, creating sustainable use of the genetic resource, and creating equal benefit sharing that raises from the biological resource in the Region, it was highlighted.

This short communication report was compiled as part of our work on the assessment of status, identification of threat, and monitoring of Kundudo feral Horse in collaboration with stalk holders. The aim of this report was to compile data from different sources including secondary data, reports from the woreda focal office, interviews with woreda experts and guards directly working on Kundudo feral Horses. Data such as trends, status, and threats to Kundudo feral Horses were compiled from mentioned sources. Such kind of information will be of great importance since there is a scarcity of information on these precious genetic resources which will fill some gaps that exist.

### Location of Kundudo feral horses

Kundudo feral horses are located in the Gursum district of Eastern Hararge Zone, Eastern Ethiopia on the top of Kundudo (sometimes called ‘W-Mountain’ due to its appearance) location of Kundudo Mountain and Kundudo Feral Horse is depicted in (Figure 1). This Mountain was bordered by two Woreda Gursum woreda and Jarso Woreda and their capital town were Fugnan Bira and Ejersa Goro respectively. From the

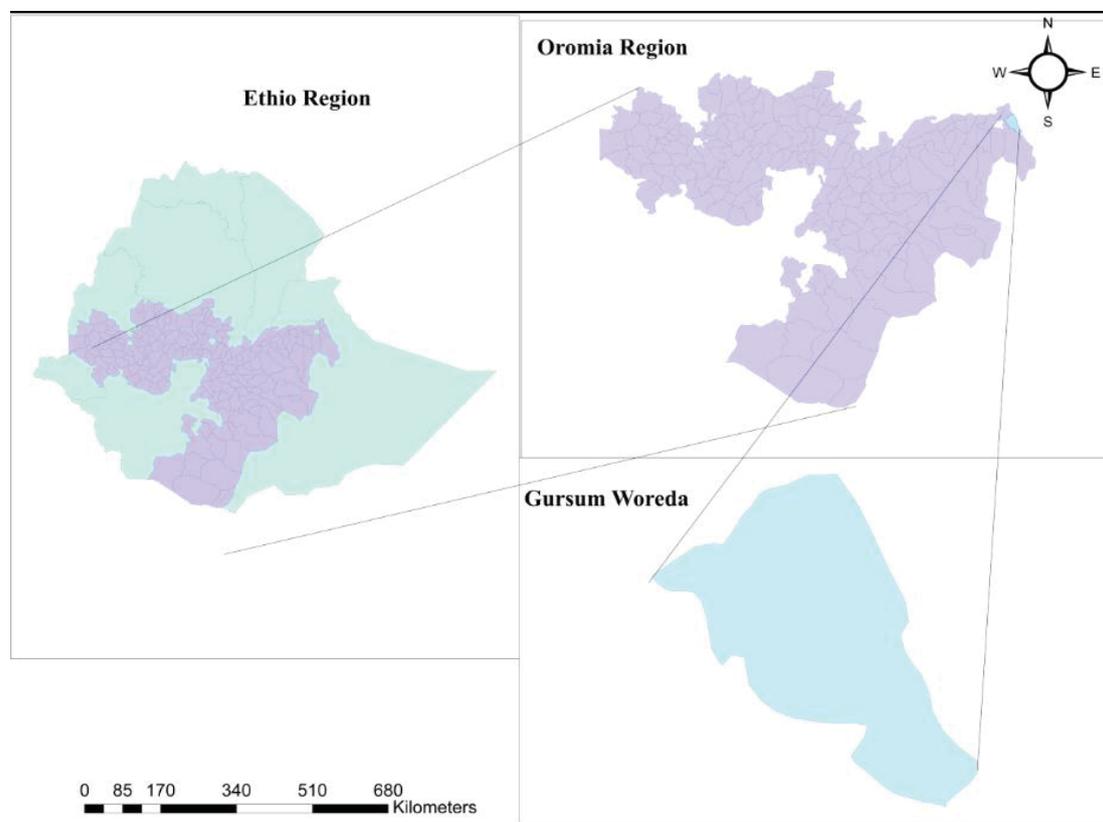


Figure 1: Location of Kundudo Mountain and Kundudo Feral Horse.

Gursum Woreda (Madaro, Goba, and Harashi Kebeles) are the nearest kebeles and Jarso Woreda (Badada, Chala, Gidaya Lito kebeles) are the nearest kebeles. The altitude of this mountain is 2900m.

This mountain (Figure 2) is an amba, flat-top Mountain, 26 km from Harar on a direct line, 70 on the road. It is seen at a distance above the roofs of the thousand years old Jogol, a UNESCO World Heritage site, the only walled city south of the Sahara [7]. The top of this mountain was a wetter grassland than any around, holding a pack of wild horses, the last in the whole of East Africa. There is also a small round pond from which horses use water and the 13 hectares flat top grassland for feed.

Mountain of high naturalistic and geologic interest, on a vast and potent basement complex made of strata of sedimentary rock [7]. The sedimentary base has many cavities and sometimes stalactites insight. Above it surges the summit basaltic mass, a few hundred meters thick, culminating in a green flat top (amba) with a permanent pond and small temporary bogs. On the oriental slopes, the magmatic materials reach lower areas. On those inclines it is easier to evaluate the marvel this place was just about a decade ago: the original vegetation is found in tracts thanks to some imposing trees and a few relict wooded patches. This area was covered then by the now lost nearly 9,000 hectares of the Menderro State Forest.

### Trends, conservation status and threats to Kundudo feral horse

**Trends and conservation status:** Currently, the Kundudo feral horses were conserved in situ at the top of Kundudo Mountain. The number of Kundudo feral horses reported in 2010 was 9 and raised to 18 in 2013 as depicted in [Figures 3,4]. The main reason for this rise may be at that time local community did not start to capture for their own purpose. Cited in [8] and stated in Figure 4, Suddenly, the population of Kundudo feral horse breed declined at an alarming rate from 18 in 2013 to seven in 2015 due to the fact that the animals became vulnerable to wild predators, a situation caused by the degradation of environmental resources, and also because local community members started to bring them and keep under captivity for various purposes. Furthermore, the reason for this decrease in the population may be a lack of haylage preparation, absence of feed store, absence of diversified pasture grasses, and poor management of the available pasture in connection with the lack of water creating a risk of feed supply for the horses that leads to the horses being fed not in accordance with their nutritional requirements. Scarce availability of water for drinking, and cleaning, and the absence of management activities may also contribute to the decline of the horses. Some of these problems are also currently seen as a problem to Kundudo horses. This called for an appropriate intervention which led to the designing conservation strategy by increasing the population size of the breed.

As a result of this decline in the population, for the last five years, the Ethiopian Biodiversity Institute (EBI) and Oromia



A. View during dry season

B. View during Rainy season

Figure 2: Kundudo Mountain- where the feral horses located.



Figure 3: Kundudoo feral horses on the top of the mountain.

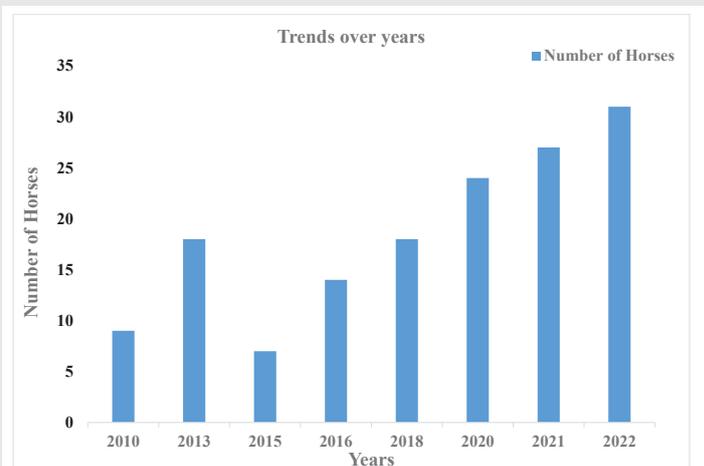


Figure 4: Trends of kundudo Feral Horses over years.

National Regional State Environment, Forest and Climate Change Authority (OEFCCA) started to work in coordination to conserve Kundudo feral horse breed. As a result of the cooperation of these two organizations particularly the OEFCCA local branch and EBI local branch, their population increased from 7 in 2015 to 24 in 2020 out of which 13 males and 11 females as shown in (Table 1); at the end of 2020 and starting of 2021 the total number of Horses raised to 28 out of which 16 were males and 12 were females and out of 12 females one female died for an unknown reason and there were left with 11 females making 27 total number of horses in 2021. Currently, in 2022 there are a total of 31 feral horses on the top of the mountain protected by guards. Generally, the number of this horse breed will be expected to rise if protected well.

### Threats and challenges to Kundudo feral horses

Even if the status of feral horses and their conservation was going perfectly there were some problems we encountered as we discussed with Woreda experts and guards. The main and major problem to the conservation of feral horses is the

**Table 1:** Breeding status of Kundudo Feral Horses over three consecutive years: 2020, 2021, 2022.

Years	Number of Horses in each sex		Total Number of Horses
	Male	Female	
2020	13	11	24
2021	16	11	27
2022	19	12	31

logistic problem of transport and scarcity of feeding for horses as the number of horses is increasing from time to time but the feeding source was not sufficient to support them. Another problem was security guards' unable to perform their duties due to the low salary scale, lack of rain-protecting clothes, and lack of houses to live in. Furthermore, low level of health monitoring compared to the expected 4 rounds in one year, and also fear of tigers because they eat horses when they sleep.

The main threats to Kundudo feral horses include inbreeding due to their low number which can cause inbreeding depression, habitat and landscape degradation, climate change impact, encroachment due to an increase in the human and animal population, deforestation of natural resources, loss of heritage of Horses, animal diseases outbreak, unable to budget from the government, land-use conflicts lead to deforestation, low enforcement in conservation and protection of Kundudo Horses.

### Major activities performed

For the last five years, the Ethiopian Biodiversity Institute (EBI) and Oromia National Regional State Environment, Forest and Climate Change Authority (OEFCCA) have been working in coordination to conserve Kundudoo feral horse population as a result the population number of feral horses reached 30 in number. OEFCCA was fully supporting the in situ conservation program financially, while EBI was technically supporting the conservation including preparing and organizing the publication of the conservation guideline which is currently in use. OEFCCA worked on three aspects including conservation, health monitoring, and guarding.

The revival of Kundudo population encourages stakeholders who participated directly or indirectly in the conservation program to have a more comprehensive long-term perspective strategy and annual details plans that will push forward the past efforts in the conservation endangered Kundudo Feral Horse breed. The review of accomplishments of activities for the last five years also tells stakeholders how to interact among themselves for better management of the breed to enhance accomplishments in the future. Having many negotiations among stakeholders, prominent stakeholders have reached a consensus and signed MoU on further engagement and tried to develop a new way of communication and management arrangement. Based on the new arrangement, the management and leadership of reviving the breed and its environment has transferred to EBI, while OEFCCA and Haramaya University (HrU) will be key stakeholders.

Even though the number Kundudo Feral Horse breed population is increasing through all those efforts by

stakeholders carried out so far, the breed is still under the critically endangered category by an international standard. Thus, there is still an urgent need to enhance the efforts to restore further of the endangered horse breed through applying possible means of research, conservation, and sustainable reproduction programs. These will be accomplished both by strengthening the existing practices and implementing additional measures such as Research, communication, and outreach programs; implementation of further conservation measures; managing the watershed/ecosystem of Kundudo Mountain; carrying out capacity building and participation of all stakeholders as well as decreasing the deleterious effects of inbreeding of the small population.

Cited in [8,9], through the collaboration of Oromia Environment, Forest and Climate Change Authority, Ethiopian Biodiversity Institute (EBI), and other stakeholders, the following major activities have been undertaken.

- ★ Awareness-raising campaigns were conducted and training was given to the stakeholders,
- ★ The horse's natural habitat, Kundudo Mountain, was recognized as an in-situ site by the community,
- ★ The Oromia National Regional state allocated a budget to compensate farmers who kept the horses under their custody,
- ★ The horses moved to their original place on the mountain,
- ★ Personnel were hired to monitor the status of the horses under in-situ conditions, and
- ★ A management manual was prepared to lead the conservation program.
- ★ MoU was signed between Haramaya University, Ethiopian Biodiversity Institute, and OEFCC on further engagement and tried to develop a new way of communication and management arrangement.

### Conclusion and recommendation

Kundudo Feral Horses are the only feral horses in the country and one of the two African wild horses the other being Namibian Wild Horses. Thus, there is an urgent need to restore this endangered horse breed by applying possible means of conservation and sustainable reproduction programs. There are tools used to restore this breed which has already been started to practice in in-situ conservation techniques and this should be supported by ex-situ in-vitro conservation. Generally, the conservation of biological diversity is important particularly the conservation of threatened animal genetic resources like the unique horse species of Kundudoo Mountain because there is no duplicate copy of species that has been conserved.

Based on this short communication report, for better conservation of such precious biological diversity the following point was forwarded as a recommendation:

1. Community-based conservation through restoration and captive breeding of feral animals is a feasible way to revive them.
2. Helping guards to perform their duties easily and efficiently particularly, supplying clothes.
3. Capacity building for woreda experts and awareness creation for local people.
4. Continuous monitoring of the status of feral horses.
5. Electing the Kondudo to an Animal Sanctuary
6. Bettering the access roads conditions
7. Putting a Police post on the way between Gursum and Bombas, to avoid possible bandits' attack, a thing sometimes occurred in the past.
8. Participate through the ETTC in the promotion of the locality as a complement to Harar itself.
9. Complete the wild horse research with the participation of as many interested bodies as feasible, some first DNA results expected within 40 days
10. Enforce the no encroachment, no livestock policy around the amba's top: easily enough, put a manned cow gate on the narrow, single existing access to the top.
11. Check on the horses, the amba's top, and the pond's ecological balance
12. Method through which trends of these horses are recorded should be developed
13. Cooperation among as many as possible stakeholders should be done
14. Regarding the budget problem government should allocate enough money for efficient conservation activities to be implemented. Furthermore, other than

the government, fundraising mechanisms should be developed and fund seeking from other NGOs working in related areas should be performed.

15. Continuous monitoring of health status should be done
16. Feeding and watering should be allocated on time
17. Research activities such as morphological and molecular characterization, studying the prevalence of disease, and perception and attitude of local communities about feral horses should be studied.

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